

# Rubblizing in Illinois



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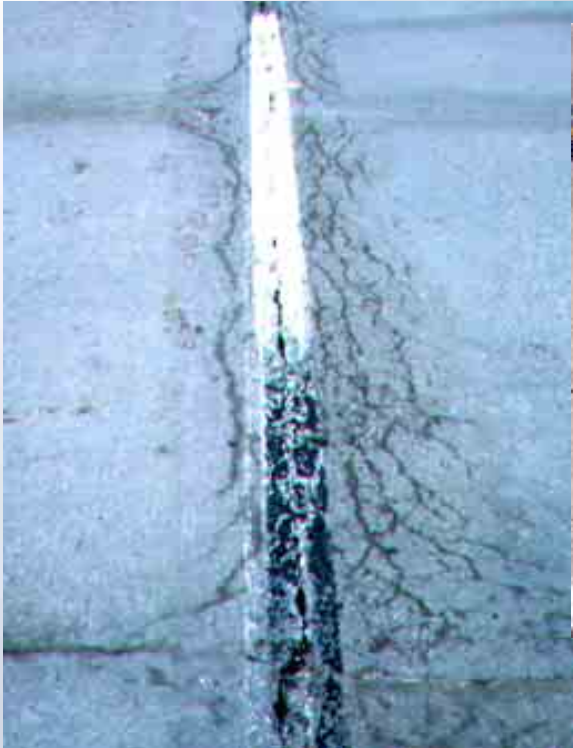
# Why Rubblization?

- Aging infrastructure
- Material durability of old PCC
- Multiple overlays on many routes
  - Reflective cracking problems
- What you put on the plans is what you get
  - No patching quantity creep
  - Known construction time
- Cost

Is 30% Patching The Thing to Do Here?



# D-Cracking - a.k.a. “self-rubblization”

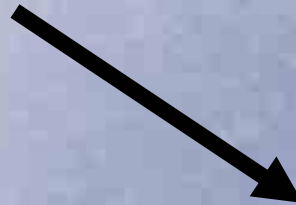


# Rubblizing

PCC Slab



AC Overlay



Rubblized PCC Slab



# Rubblizing History

- First Project 1990 - Part of SHRP-LTPP
  - I-70 near Pesotum
  - Used Resonant Breaker
  - Overlays of 6" and 8"
  - Concern Over Traffic Control
  - Felt Projects Should be Limited to Closed Roadways Due to Traffic Encroachment



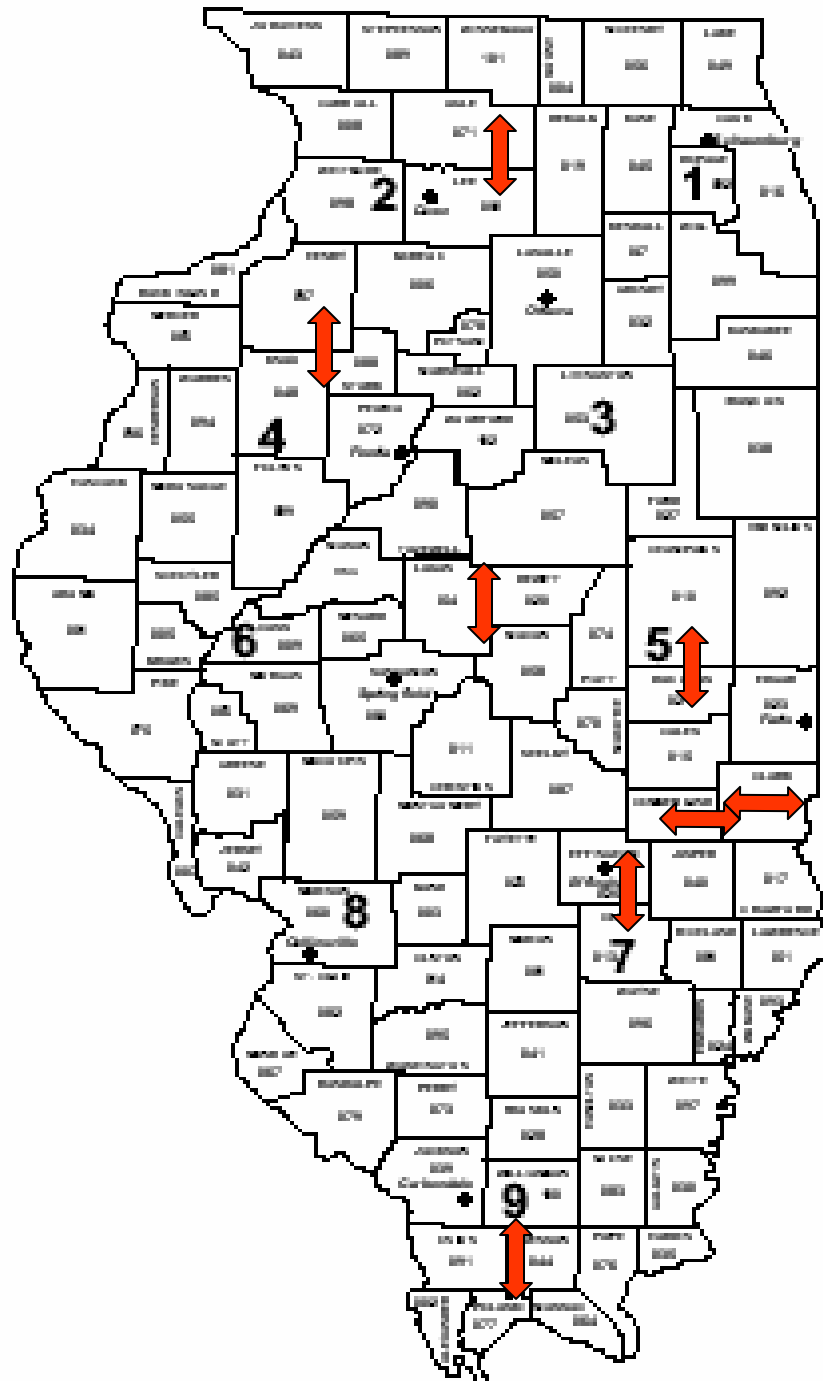


# Equipment

- Multi-head breaker
  - Single pass
  - Z-Grid roller required
- Resonant frequency breaker
  - Multiple passes (18 to 20 per lane)

# Project Selection Factors

- Existing pavement condition
- Subgrade
- Overhead clearances
- Transitions to mainline structures
- Utilities
- Proximity to buildings, other structures
- Underdrains



- 1990 First Project I-57 near Pesotum
  - PB-4
  - 6" and 8" Overlay of 10 Rubblized
- 1994 IL-38 Dist 2 and I-55 Front Rd.
  - PB-4
  - IL 38 - 6+1" over 9" Rubblized
  - I-55 FR 5" over 10" Rubblized
- 1996 I-57 Dist 7 near Edgewood
  - Multi-Head Breaker (MHB)
  - 6" and 8" Overlay of 8" Rubblized
- 1997 I-57 Dist 9 near Anna
  - MHB
  - 9" Overlay of 10" Rubblized
- 1997 I-70 Dist 5 near Greenup
  - MHB
  - 9, 10 and 11" Overlay of 8" Rubblized
- 1999 I-74 Dist 4 near Woodhull
  - MHB
  - 11" Overlay of 7" Rubblized
- 2003 I-70 Dist 5 near Marshall
  - 17.5" Overlay of 8" Rubblized

# Construction Sequence

- Install underdrains
- Mill existing overlays
- Widen if needed
- Replace unsound HMA patches
- Rubblize pavement
- Compact broken pavement
- Pave binder lifts (allow traffic if nec.)
- Pave surface lift



























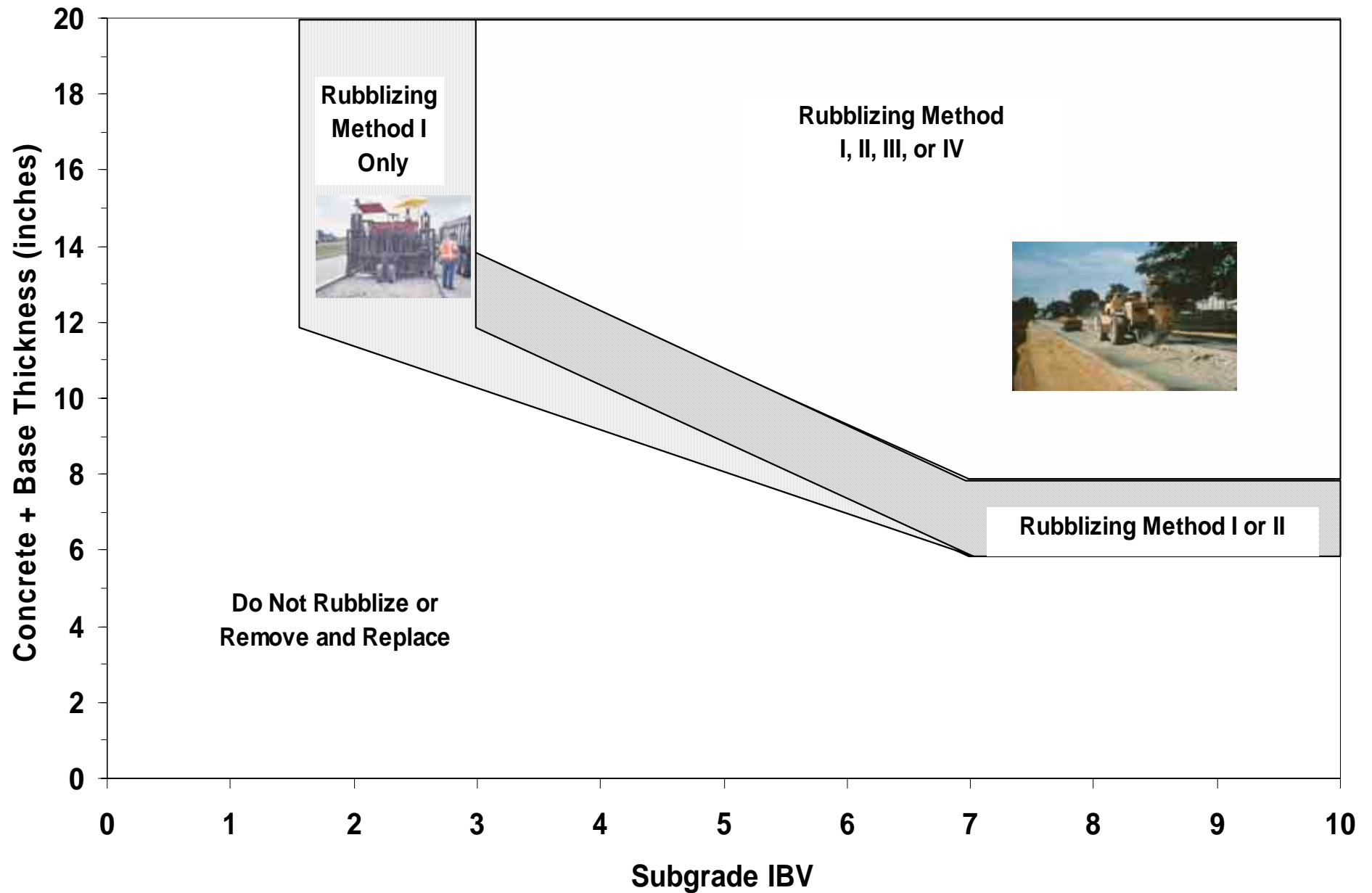
# Guideline Developed May 2000

- Requires soil investigation
- Selection of equipment
- 10Yr+ design
- Design thickness charts

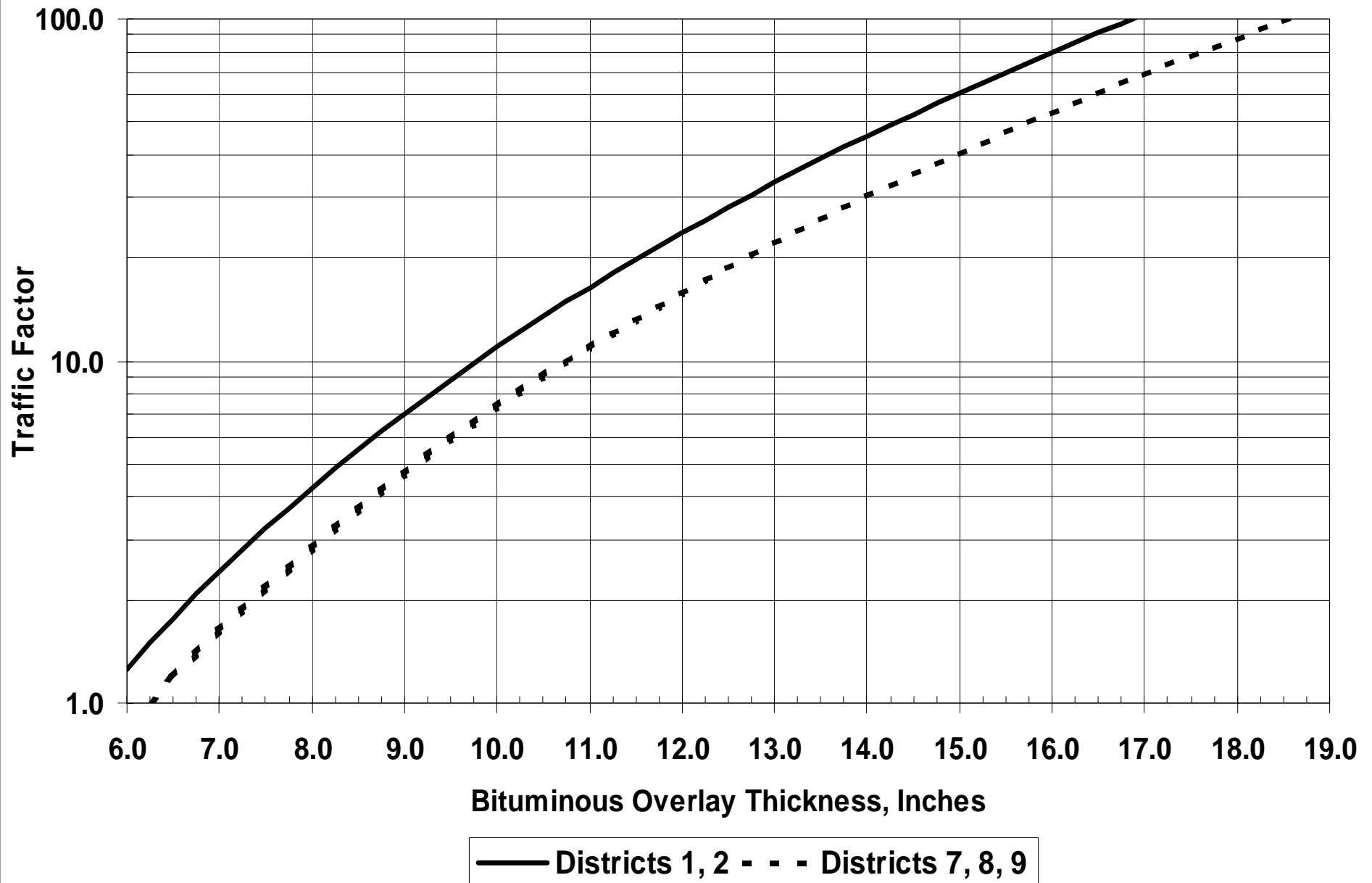




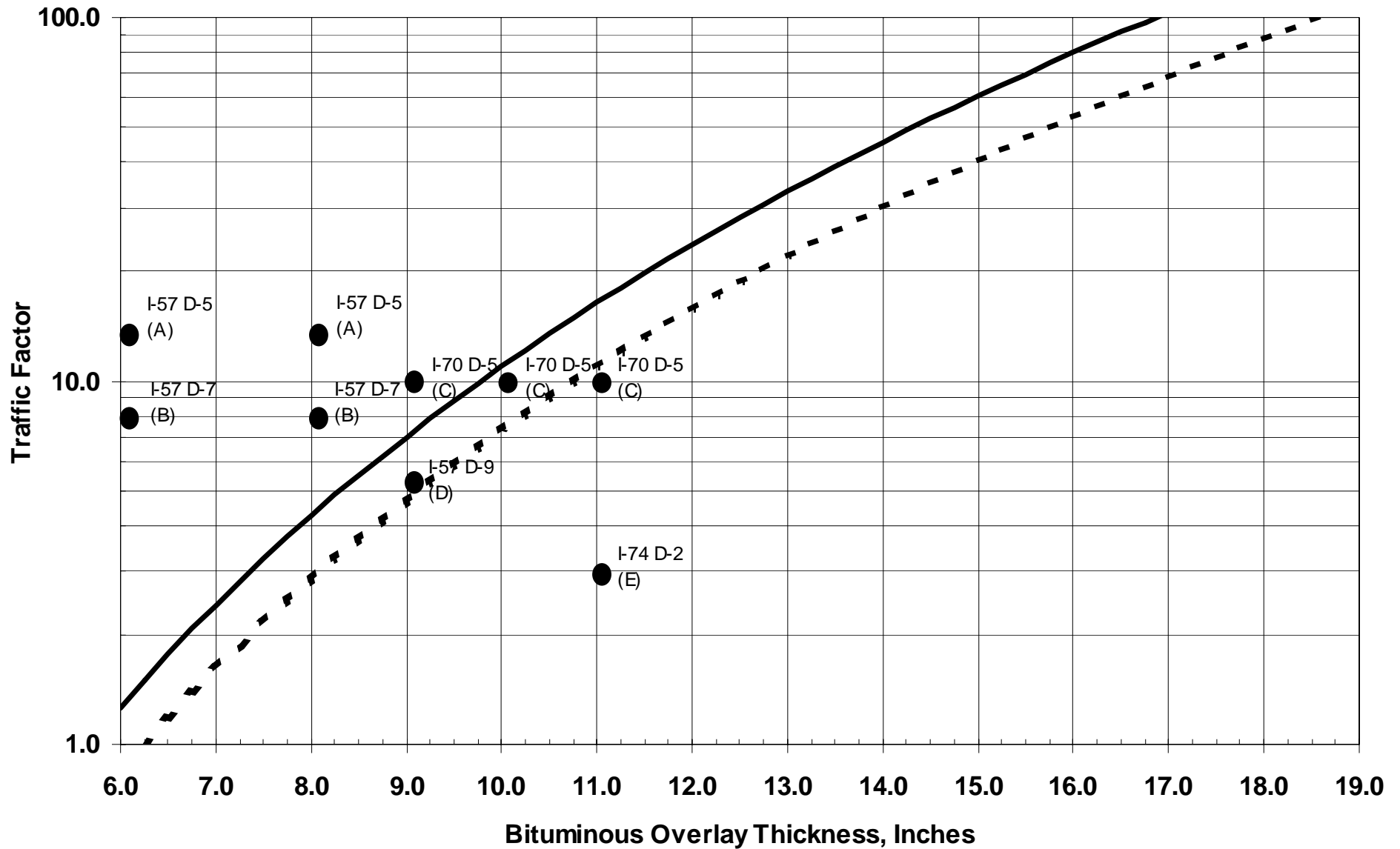
## Subgrade Rubblizing Guide



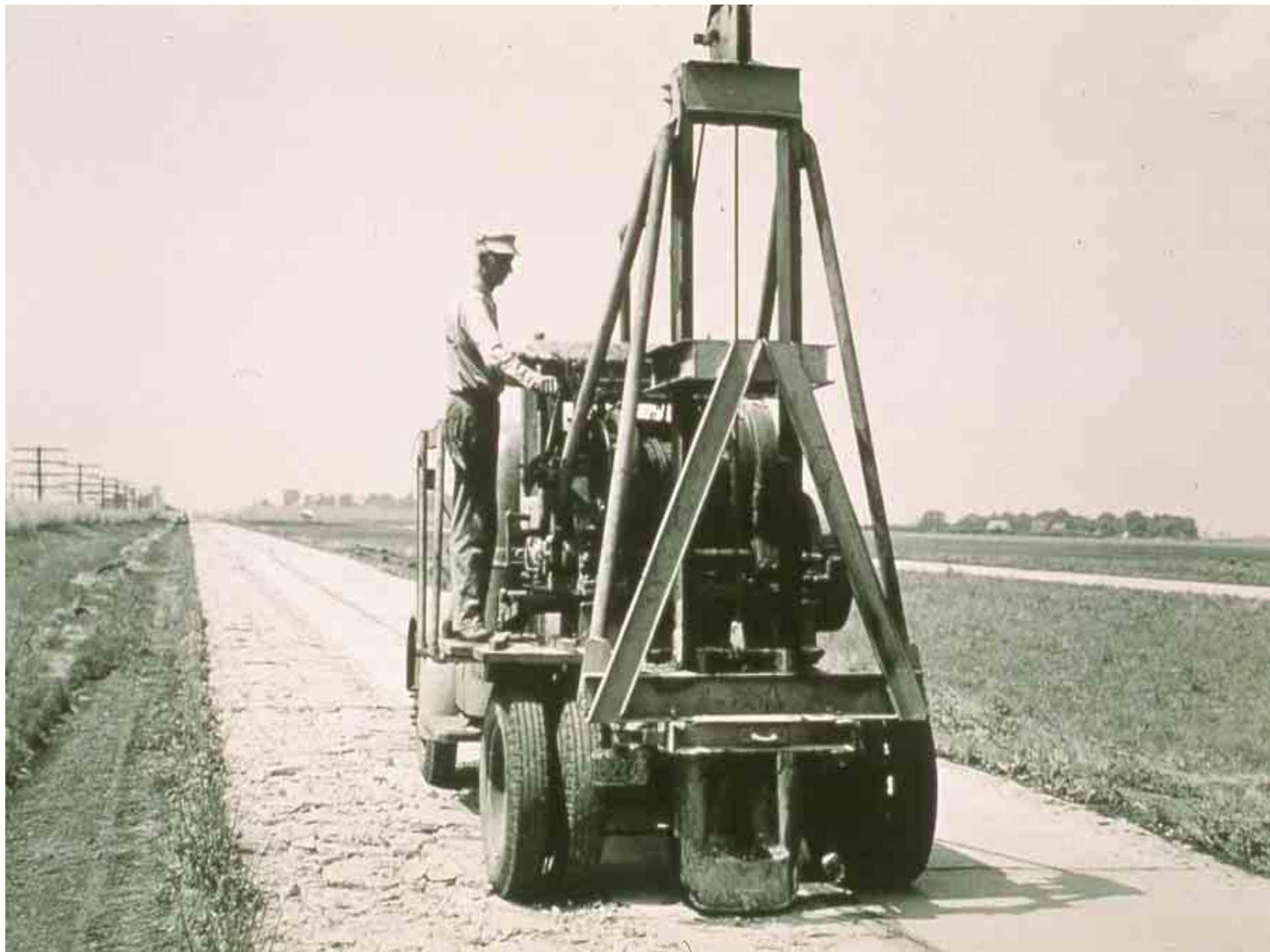
## Bituminous Overlay Thickness for Rubblized Pavements



## Bituminous Overlay Thickness for Rubblized Pavements



— Districts 1, 2 - - - Districts 7, 8, 9





# Multi-Head Breaker



# Z-Grid Roller



# Resonant Frequency Breaker



# Project History

- First project in 1990 near Pesotum
  - SHRP SPS-6 experiment
- 12 projects on State routes to date
  - 7 include experimental features
  - 1 designed with a 30-yr. design period

# Project Performance

- Automated data collection vehicles
  - IRI
  - Rutting
  - Digital imagery
- Manual distress surveys
- Falling weight deflectometer testing

Pesotum 1990-2004

# I-57 Patch and Overlay 0 – 100 feet



Pesotum 1990-2004

**I-57** Patch and Overlay 100 – 200 feet



Pesotum 1990-2004

**I-57** Patch and Overlay 200 – 300 feet



Pesotum 1990-2004

**I-57** Patch and Overlay 300 – 400 feet



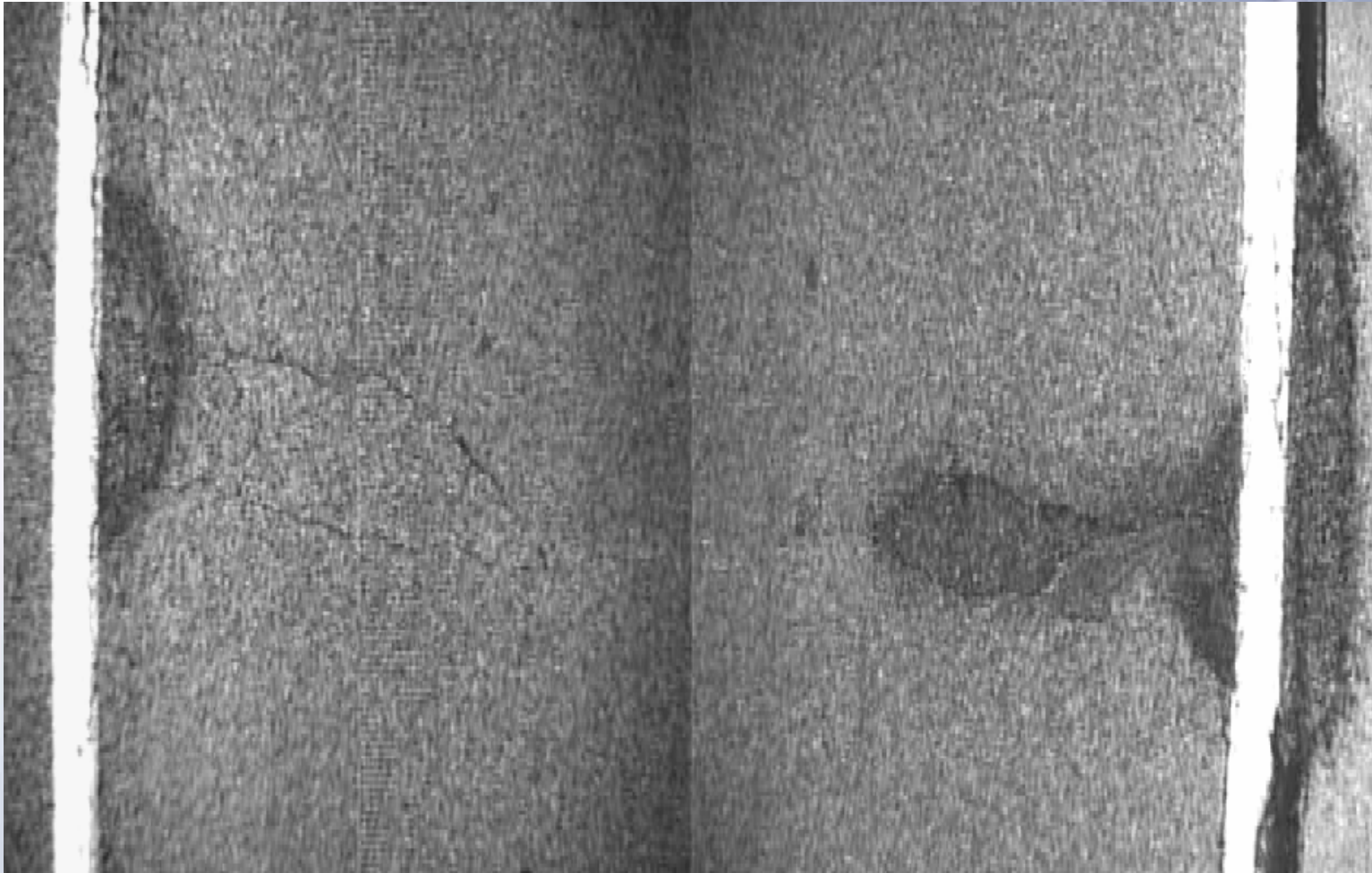
Pesotum 1990-2004

**I-57** Patch and Overlay 400 – 500 feet



Pesotum 1990-2004

# I-57 Patch and Overlay Down Image



Pesotum 1990-2004

# I-57 Reflective Crack Control 0 – 100 feet



Pesotum 1990-2004

**I-57** Reflective Crack Control 100 – 200 feet



Pesotum 1990-2004

**I-57** Reflective Crack Control 200 – 300 feet



Pesotum 1990-2004

**I-57** Reflective Crack Control 300 – 400 feet



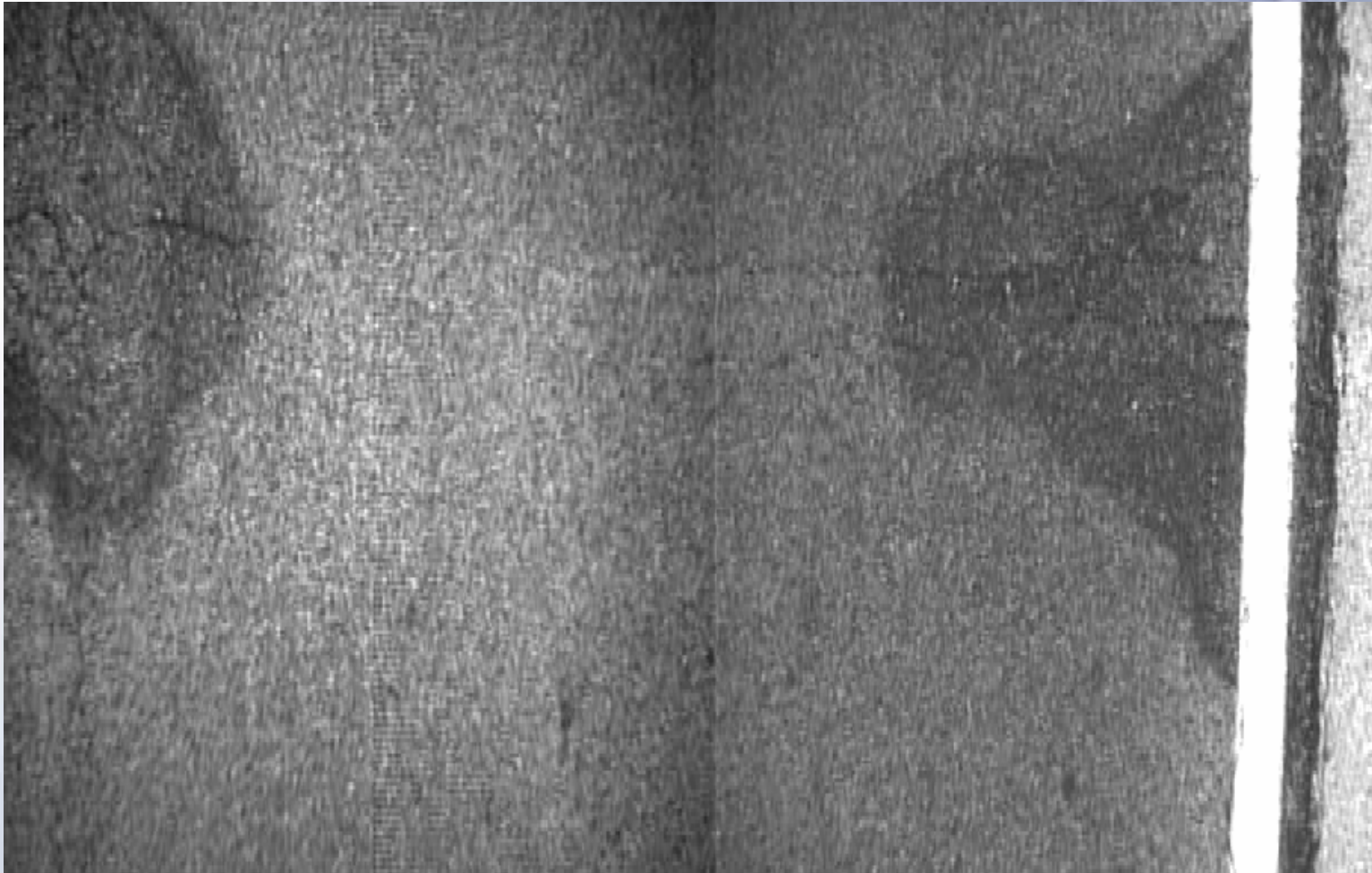
Pesotum 1990-2004

**I-57** Reflective Crack Control 400 – 500 feet



Pesotum 1990-2004

# I-57 Reflective Crack Control Down image



Pesotum 1990-2004

**I-57** 6" Rubblizing 0 – 100 feet



Pesotum 1990-2004

**I-57** 6" Rubblizing 100 – 200 feet



Pesotum 1990-2004

**I-57** 6" Rubblizing 200 – 300 feet



Pesotum 1990-2004

**I-57** 6" Rubblizing 300 – 400 feet



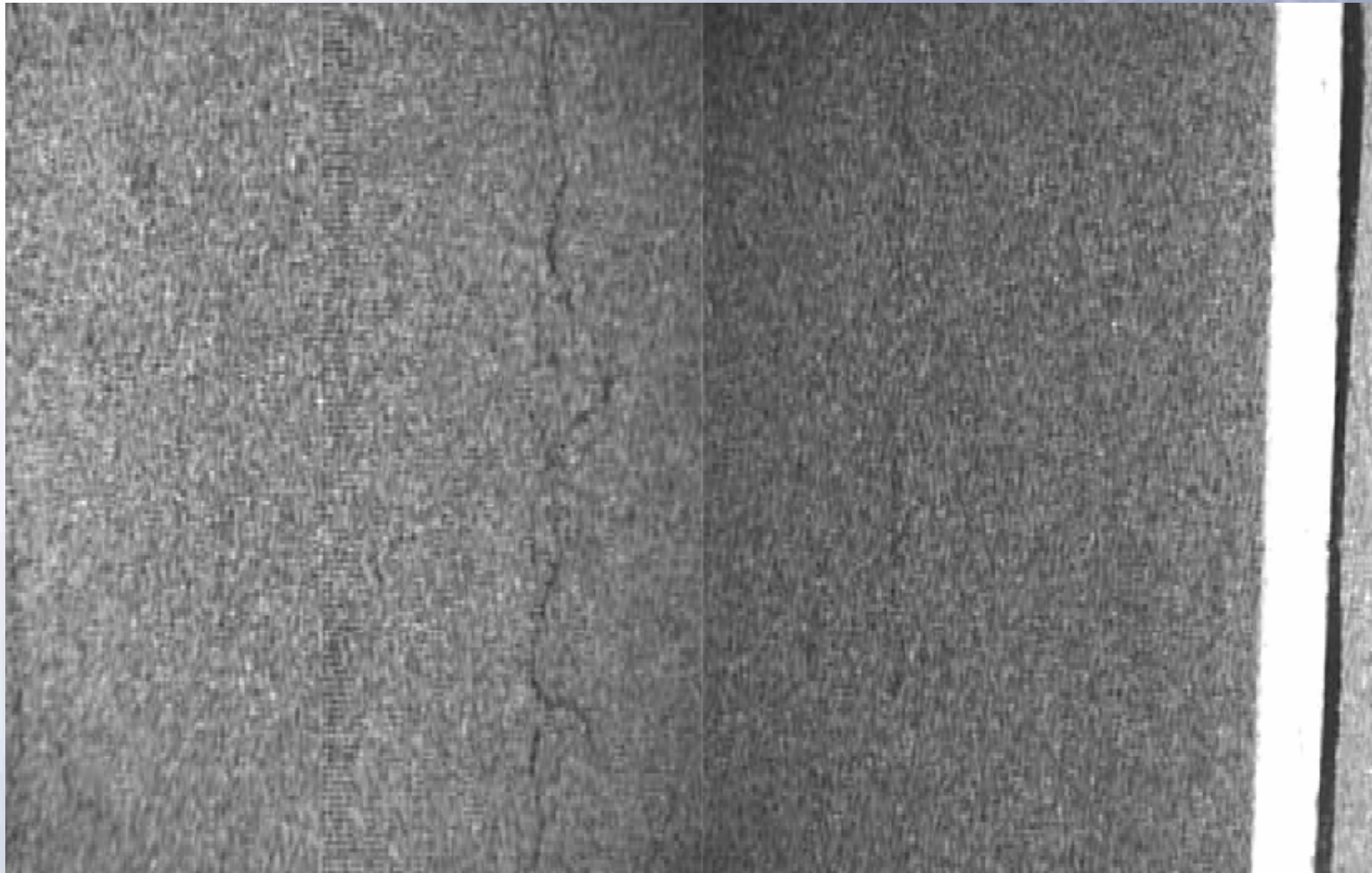
Pesotum 1990-2004

**I-57** 6" Rubblizing 400 – 500 feet



Pesotum 1990-2004

# I-57 6" Rubblizing Down Image



Pesotum 1990-2004

I-57 8" Rubblizing 0 – 100 feet



Pesotum 1990-2004

**I-57** 8" Rubblizing 100 – 200 feet



Pesotum 1990-2004

**I-57** 8" Rubblizing 200 – 300 feet



Pesotum 1990-2004

**I-57** 8" Rubblizing 300 – 400 feet



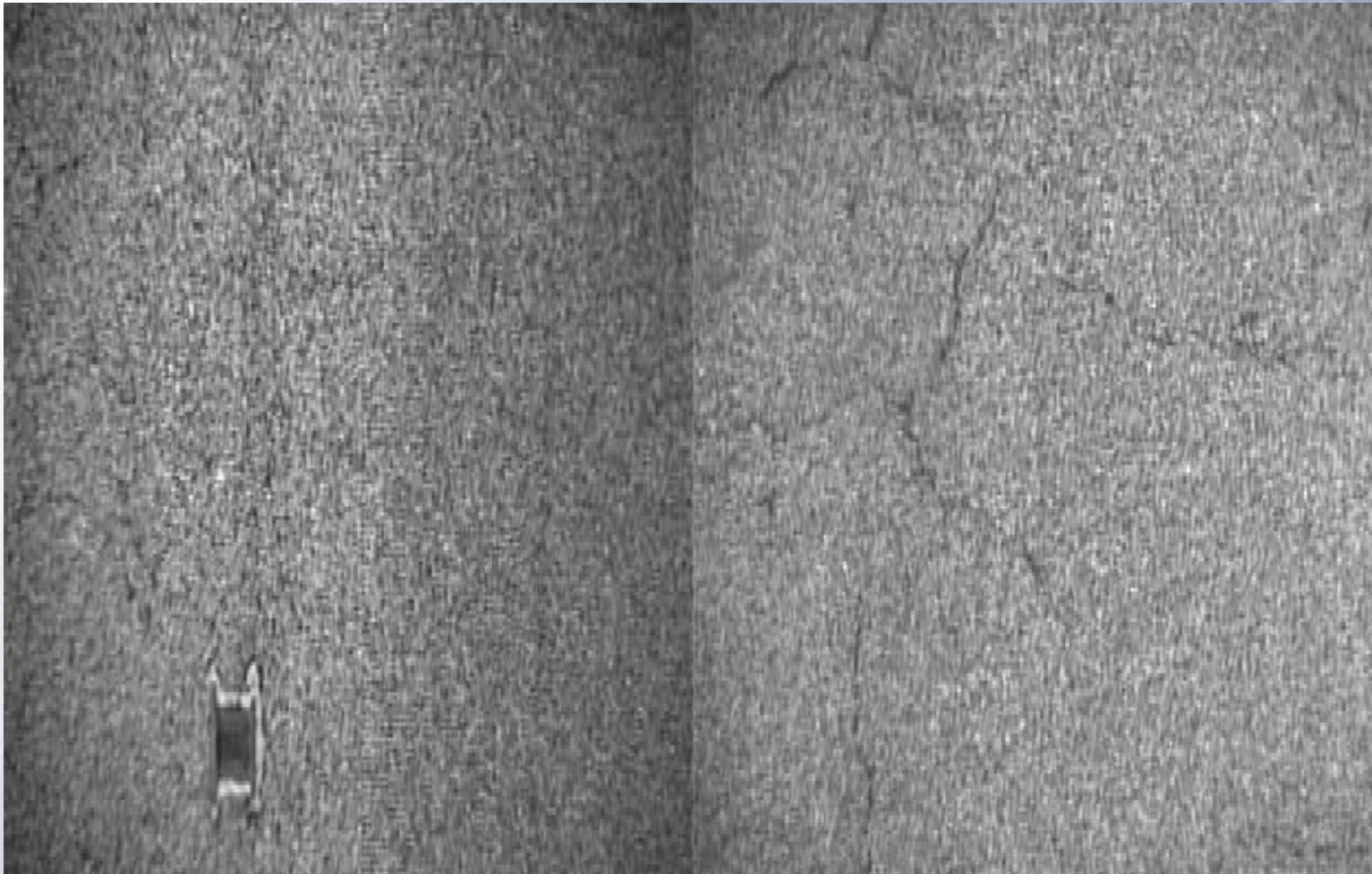
Pesotum 1990-2004

**I-57** 8" Rubblizing 400 – 500 feet



Pesotum 1990-2004

# I-57 8" Rubblizing Down Image



# Conclusions

- Illinois' experience with rubblization has been a positive one.
- Rubblization is both reliable and cost-effective.
- Properly constructed sections have performed as well, or better than, control sections.
- On average data indicates 1-2 years extra life with better performance.

# A. Lincoln Presidential Museum and Library



# Questions?

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## Web Report:

**RUBBLIZING WITH BITUMINOUS CONCRETE OVERLAY  
– 10 YEARS' EXPERIENCE IN ILLINOIS**

Link:

<http://www.dot.il.gov/materials/research/pdf/137.pdf>